TANNATT WILLIAM EDGEWORTH DAVID.
1858–1934.

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(With Portrait.)

An accomplished scholar, inspiring teacher, intrepid explorer, enthusiastic geologist, devoted patriot, generous in purse and person for a good cause, few men have displayed such versatile gifts in many-sided achievements as Tannatt William Edgeworth David; known to his own people as Edgeworth, to his wife as Twed, and to an applauding public as 'Professor'. Race, parentage, birth-place, teachers, all contributed to that notable combination of mental, moral and physical attributes that went to the making of him who was so widely known and acclaimed as the Knight Errant of Science.

His father was the Rev. William David, M.A., Fellow of Jesus College, Oxford, and Rector of St. Fagan's, near Cardiff, Glamorganshire. Sprung from a long line of David-ap-Davids, whose genealogies and traditions were subjects of his literary researches, he, with unusual parental devotion, used his scholarship in the early teaching of his three sons, of whom Edgeworth was the first-born. The influence of this fine start was shown in the lad's love of good poetry, as also in his success in the classics that accompanied his school and college career.

His mother was Margaret Harriet Thomson, daughter of a distinguished military officer in Quebec, whose ancestry included two notable branches—Ussher and Edgeworth. The former was famous for that Archbishop of Armagh, whose quaint 'Chronologia Sacra', published in 1686, was the accepted authority on Cosmic history in orthodox circles until recent times. The latter branch, of which David was, very naturally, proud, contained the distinguished names of Maria Edgeworth and the saintly Abbé Edgeworth, memorable for that last service and salute to his unfortunate King, Louis XVI.

The combination of Scotch, Irish and Welsh in his ancestry deserves notice.*

Tannatt Houston Thomson (Scotch) m. Margaret Ussher (Irish)
|
Margaret Harriet Thomson m. William David (Welsh)
|
Tannatt William Edgeworth David

St. Fagan's itself was interesting scenically and historically: scenically, for nowhere in Wales are the mountains far distant; historically, as the scene of a battle in Cromwellian days, amongst many other local traditions, in which the Celtic imagination of the youthful Edgeworth revelled. The neighbouring Brecon Hills were also the scene of his earliest field work in geology.

From his father's tuition he passed on to Magdalen College School, Oxford, of which he rose to be head boy, as well as captain of a successful football team

* This is amongst the records that Lady David has generously allowed me to borrow from her own "Life of Sir Edgeworth David", now in the press.

and of the boats. From earliest days David was a natural student, with a mind avid of knowledge, ever open to the best and singularly closed to the grosser things of life, then, as throughout his career. The teaching here, as in most English schools of that day, was chiefly founded on Latin and Greek. Mathematics was tolerated, modern languages and science were trivial playgrounds to the majority, in which schoolboy ingenuity of evasion was given free scope. That Science came later as a coping stone to this literary structure was, in fact, no handicap to David, as also in the case of Darwin. For both men, the literary training resulted in the more effective interpretation of Science to the lay world, since the influence of such men lay greatly in the popular interest aroused, as well as in the matters technically discussed by scientific colleagues. To the teacher David, this special culture was of immeasurable advantage. The boy seems to have completely won the respect and affection of his school, as also, later, of his college, teachers. Here, for example, is a sentence from a letter from the Headmaster of Magdalen College School to his father: "There could scarcely have been a better specimen of English boyhood; this in character, manners and scholarship." He opened his Oxford career by winning the Senior Scholarship in Classics at New College, and was described to me by a fellow undergraduate as "an exceptionally fresh-complexioned, good-looking chap, known in the College as 'David the Psalmist' ". Whatever he did, he did with his whole soul. Thus, while working hard—too hard as it proved—he had taken con amore to the boats, showing his physical stamina, so often displayed in later days, by rowing 'bow' of his college eight, and also of a successful four, in which the well-known Sydney citizen Mr. Consett Stephen was 'cox'. The oar, then wielded so effectively, still adorns his Waitara home. He obtained a first class in Honour Mods., the essential test of classical scholarship at Oxford. But he had overrun his strength, and a rude interruption came to his University work when his doctor ordered complete rest. A short trip to America gave little respite and, with his father's help and advice, he took the long voyage, by sailing ship, to Melbourne. After his return he was only allowed to read for the ordinary degree, which he took in 1880. This later phase of University life, however, contained the significant factor—a course in Geology under Professor Sir Joseph Prestwich. Probably this course was suggested by what appears to have been the first spark lit in his geological enthusiasm by a relative, William Ussher, a geologist whose field work in the neighbourhood of St. Fagan's found an ardent coadjutor in his young cousin. Returning home from Oxford, and quick to take advantage of this new light, he set about the study of glacial action in South Wales. The result of this was the publication of his first scientific paper, "Evidences of Glacial Action in the Neighbourhood of Cardiff", by the Cardiff Naturalists' Society in 1881. For this and other scientific contributions, the Freedom of the City of Cardiff was conferred on him—a memorable honour to so young a man.

By this time David appears to have definitely decided on his profession, resisting considerable parental pressure to enter the church, not without incurring grave suspicions of spiritual or doctrinal deficiencies. A further temporary flirting with the idea of Medicine ended with the continuation of the study of Geology at the Royal School of Mines under Professor Judd and Professor Boyd-Dawkins of Owens College, Manchester. In 1882 he was selected by Sir Henry Parkes, then in England, for an appointment on the staff of the late C. S. Wilkinson, of the Geological Survey of New South Wales, and booked his passage by the Orient S.S. *'Potosi'*. By one of those freaks of destiny this voyage was momentous, since

the lady who was to share, and greatly influence, a long life with him was a fellow passenger. Sir Henry Parkes had also selected Miss Caroline Mallett as head of the Hurlstone Training College for State teachers. Each of these unusual migrants had been advised of the other, but for some time failed to recognize the proverbial man of science and the stern preceptress in the guise of attractive youth. The romance, thus begun, developed into a very real and lasting happiness. Not only did Mrs. David—they were married in July, 1885—greatly help her husband by her firm, unvarying belief in his ability, but, as he became more and more absorbed in his work, regardless of his own material interests and comfort, it was she who protected hearth and home. One remembers her, too, as the social centre of science congresses, as at Hobart in 1892 and Dunedin in 1904, and then, as today, a leader of important movements. She also accompanied him on his early survey camps, encouraging his prentice hand and voice in lectures on his work—overcoming an extreme shyness and diffidence characteristic of his early days. Indeed, her influence was largely responsible for his finding the courage to accept the new Chair of Geology at the University of Sydney to which he was appointed in 1891. During the nine years of his Government work, David investigated the fossiliferous Silurian beds of Yass, and surveyed the rich tin-bearing leads of New England, on which he wrote an exhaustive memoir in 1887. But most important of all were his researches in the Hunter River coal-fields and his tracing of the famous Maitland–Cessnock coal-seams, which have added almost incalculable wealth to the State. He himself probably found far greater interest in the fauna and flora of the Permo-Carboniferous strata, while his first love of glacial phenomena found ample scope for investigation. Later, as Professor, he took a party of students during vacation to Maitland to test his theory of the approach of the Greta coal-seam to the surface. Arriving at the selected spot they were met by an obstinate farmer who objected to holes being made in his land. Only by diplomacy and a promise to restore the status quo was the experiment permitted. At 30 feet the Professor had foretold the evidence—and there it was. So various and voluminous were his activities in these coal-fields that long after he had ceased his connection with the Department his services were requisitioned. Here is an example that came directly under the present writer's notice. In 1904 David was President of the Dunedin meeting of the Australasian Association for the Advancement of Science. After a frantic rush of condensed work during the active week of this congress, his wife and friends had hoped that he could enjoy some rest in the social and scenic side of things that went with the second week of the meeting. Alas, a wire from E. F. Pittman came to remind him of certain unfinished reports on the coal-fields, and, with Spartan self-denial, he promptly left these premeditated joys to take the first boat back to Sydney to pass his vacation in monotonous work. His presidential address for this meeting—begun on the boat from Sydney—was only completed by an all-night sitting, preceding its delivery in our joint lodgings.

At the University David soon showed himself to be a galvanic force of inspiration to an important and growing school of geologists. Amongst his many gifts was great talent as a draughtsman and artist. This, combined with his glowing enthusiasm, first-hand knowledge and natural sympathy with youth, made him an extraordinarily forceful teacher, and the lucid and copious lessons of the lecture room were supplemented by courses of field work, conducted by himself and Mrs. David. Many an active student was worn with fatigue while the indefatigable professor set the pace, apparently little hampered by a weighty

bag of specimens and geological hammer. This enthusiasm was passed on—it is the hall-mark of a great teacher—to a long procession of able geologists, who have filled important posts in Australia. Andrews, Benson, Browne, Cotton, Jensen, Mawson, Simpson, Sussmilch, Walkom, Ward, Woolnough provide an index of the standard of the school initiated by David.

In 1897 he led the second expedition to Funafuti, in the Ellice Islands, to test the Darwinian hypothesis of the structure of coral reefs. Raising private subscriptions—himself largely contributing—and obtaining from the Government the loan of a complete drilling plant, together with a staff of competent workmen, David, accompanied by his wife, a few volunteer students—including W. G. Woolnough—sailed for Funafuti, where the reef was bored to a depth of 643 feet. A further extension to 1,114 feet was carried out by A. E. Finckh. The core from this bore was investigated by a special committee in England and a vast tome records its report. This achievement was warmly acclaimed in the world of science and the F.R.S. was awarded to the leader of the expedition, besides the Bigsby Medal of the Geological Society of London. A delightful description of the island and its people is contained in another volume, 'Funafuti', by Mrs. David.

From 1897 to 1907 David was attracted to the evidence of glacial action on the Kosciusko plateau, largely through the observations of Richard Helms in 1889 and 1893, who exhibited an ice-scratched block to this Society. Two papers were published on this subject. The first, in March, 1901, in conjunction with R. Helms and E. F. Pittman, is entitled "Geological Notes on Kosciusko", the second, by himself, "Geological Notes on Kosciusko, with special reference to Evidences of Glacial Action". The latter was the outcome of a summer holiday camp, in which Judge Docker—a first-rate photographer—took part. Roused by the yarns of the guides of that period, as to the bottomless depth of the Blue Lake, David showed his ingenuity and revived some traditions of boyhood by devising a coracle for the taking of soundings. This coracle was made with wreaths of gum twigs, wire netting, and an outer skin of American cloth. The sounding line was a ball of string, measured off with coloured wool in foot lengths and weighted with a pound of shot. The actual depths across the lake were thus accurately taken. Many excellent stereoscopic photographs of this expedition were taken by Judge Docker.

In 1906 he was asked by the Chief Secretary of the State of New South Wales to represent the University of Sydney at the International Geological Congress to be held in Mexico. Leaving Sydney in May, David took the opportunity of visiting India to collect evidence of glacial action there, for a proposed paper to be read at the Congress. As usual, he was laden with geological specimens, which were given, or exchanged for others with various museums. Always the claims of Science were uppermost in his mind. One touch of humour from Mexico delighted us. President Diaz, wishing to do special honour to his distinguished visitors, sent a force of Rurales (mounted troopers) with mettled steeds, for a 12-mile excursion from Carrizal. Alas, few of the savants were capable horsemen. David himself, though laden with umbrella, camera, geological hammer and other impedimenta, survived this ordeal, but the landscape was strewn with unhorsed geologists. Some 500 miles of Mexico were traversed before this picturesque meeting was opened in state by the President himself, surrounded by ambassadors and consuls.

In 1908 the Shackleton Expedition to Antarctica sounded the trumpet of service. Chiefly through David's personal advocacy, the Commonwealth Govern-

ment granted £5,000 to the Expedition, while he himself offered to make a long vacation voyage on the '*Nimrod*' for a brief glance at the South Land. Shackleton, however, recognizing the great value of his presence, induced him to stay on as a whole-time member. Here, at the mature age of 51, he accomplished two amazing feats: (1) planning, and himself leading, the first climb of the 13,000 feet of Mt. Erebus; standing, where never man had stood, on the edge of that vast crater, after five days of strenuous and dangerous effort by six men, all of whom were without special alpine experience; (2) with two younger companions, Mawson and Mackay, achieving the discovery of the South Magnetic Pole—a journey of 1,260 miles—man-hauling two sledges of, at first, half a ton weight each. Seven hundred and forty miles of this colossal tramp was relay work, since the three men could only drag one sledge. Much of this arduous feat was over the heavily crevassed Drygalski Glacier and hummocky ice, and included the climb from the coast line to a plateau of 7,350 feet altitude. All three men were variously recovered from crevasses, saved by their sledge harness from fatal injuries. Only by amazing good fortune, and the thoughtful devotion of Captain Evans of the '*Nimrod*', were the exhausted three found on their return to the coast in February, 1909. A party of his friends, assembled to welcome him on his return, at the house of J. H. Maiden in the Botanic Gardens, noted an astonishing sea change in his appearance. The hardship and starvation, followed immediately by plenty and rest, had converted our ascetic looking professor into a full-faced man with some rotundity of person—a passing phase of brief existence.

Much of his time during the next few years was devoted to the study of the Antarctic geological material, and in lecturing throughout the Commonwealth to raise funds for the publication of the scientific work of the expedition. Later came stalwart support of further Antarctic exploration, especially of Scott's last expedition, 1910–11, and of that Australasian expedition under Mawson—now Sir Douglas—1911–12, and of the second Shackleton expedition of 1914–15.

The visit of the British Association for the Advancement of Science to Australia in 1914 again called for strenuous exertions—a visit so tragically curtailed and shadowed by the clouds of war. The geological members of this were naturally his special interest. One of them, Councillor Penck, famous amongst German geographers, was his particular guest, and David actually incurred some unpleasant suspicions through his protective advocacy of this colleague. Later, one learned that a phrase from a speech by David at this time, "All men of Science are brothers", was used as the motto of the Deutsche Entomologische Institut, Berlin. But the war found no more ardent patriot than David. He took an active part in a volunteer rifle club. He was unanimously chosen as President of the Universal Service League of N.S.W., formed early in 1915, an office only resigned for active service at the age of 58. For in 1916 he became Major of the Australian Tunnellers, a battalion raised largely through his efforts from miners and mining engineers. The eminent work of these men culminated in the colossal upheaval of the Messines Ridge. But David had now been appointed Geologist of the Line, to advise on suitable sites for underground work. In order to procure accurate geological maps for his work he applied to his O.C. for a permit to visit a Paris colleague, to receive the official reproach, "No joy-rides allowed", a reply which greatly touched his sense of humour. Later he won the same high esteem in the Army that his services won everywhere. Besides the military honour of D.S.O. with the rank of Lieut.-Colonel conferred on him, here is an extract from a farewell letter to him from an officer at the Australian

Headquarters, France, on returning to Australia: "You have been a pattern to us in courage, courtesy and tact, and, may I add, in unremitting hard work." In search of geologic truth, David used to descend the numerous wells of the war area; and this nearly ended his life. A faulty windlass, or careless handling, led to a fall of 80 feet into shallow water, a fall broken, to some extent, by the metal bucket on which he was seated. To the astonishment of the young officer who descended to the rescue, he was found alive, though badly injured—except in his undaunted spirit; for he is said to have bidden the winders to "wind slowly, since his passage down had been too rapid for accurate observation". Returning in 1919, he set himself the stupendous task of writing a work on the Geology of a Continent. In order to concentrate on this, in 1924 he resigned his Chair and was made Professor Emeritus by the Senate of the University. Henceforth, when not actually working on the MSS., he spent himself and his resources in exhausting journeys; now a trans-continental car journey to Marble Bar, or repeated trips to South Australia, refusing to travel by air, as unfavourable for geological inspection. The latter were induced by the discovery of Pre-Cambrian fossils, that set the dawn of life far back beyond the realms of recorded knowledge. This discovery David himself declared to friends to be the most important geologic event of his life, though their organic origin has been received with doubt in some quarters.

In 1926 he again visited England, to consult authorities, interview publishers and, incidentally, to attend the meeting of the British Association at Oxford in August.

In 1933 he published his monumental Geologic Map of Australia, accompanied by a volume of 178 pages of explanatory matter, as a preliminary section of his greater uncompleted work. But the fires were burning low. Friends vainly expostulated with this energetic cripple who, with painfully injured hip, the sequel of the French well, hobbled or limped on his daily visit to the University. A fall from a tram on the last of these journeys brought on an attack of pneumonia and heart weakness to which his much-tried physique succumbed. He died in the Prince Alfred Hospital, 28th August, 1934. The enormous assemblage that attended the State funeral service at the Cathedral and the long procession to the Northern Suburbs Crematorium afford some indication of the place that David held in the hearts of our people.

Known to the world as a great geologist, he was even better known as a leader of scientific thought and movement and as a popular interpreter of Science to the layman. His versatile gifts made his requisition as a lecturer or speaker so valuable that he was in constant request, and it was always difficult for him to refuse. In 1902 he was selected by the State Government as one of the two Commissioners to travel in Europe and America to report on all branches of education; but when some discussion arose as to a third Commissioner, David withdrew in favour of G. H. (later Sir George) Knibbs, whom, with his usual modesty, he considered better fitted for the work. His achievements were recognized by the honours showered upon him. He was made C.M.G. in 1910 and K.B.E. in 1920. In 1908 he was awarded the Mueller Medal of the A.A.A.S.; in 1915 the Wollaston Medal of the Geological Society of London, the Conrad Malte-Brun Prize of the Geographical Society of France, and in 1919 the Clarke Memorial Medal of the Royal Society of N.S.W. The honorary degree of Doctor of Science was conferred on him by the Universities of Oxford, Wales, Manchester,

Cambridge and Sydney. The University of St. Andrews made him Honorary Doctor of Laws.

Twice President of the Geological Section of the Australasian Association for the Advancement of Science (Hobart 1892, and Brisbane 1895), he was also twice President of this Association (Dunedin 1904, and Melbourne 1913). He was President of the Royal Society of New South Wales in 1896 and 1909, and a member of its Council for many years; President of our own Society 1893–1895, and a member of its Council until his death; and President of the Australian National Research Council 1921–22.

To his many friends, his achievements were but the flashes that illumined the background of a rare personality, in which courage, courtesy, unselfishness, modesty and humour were dominant. Of his courtesy there is the oft-told story of his delayed request to Mawson for help, when fallen into a crevasse—delayed since he was unwilling to disturb Mawson who was busy at photography.

His selflessness was phenomenal. Simple in his habits, he was the despair of his family in matters of food and dress: often going without food all day when any special work was on, and declining to waste time in visits to a tailor. His habit of seeing the other fellow's point of view came out in a story related only a few days ago by his old fellow colleger, Mr. Consett Stephen. Before accepting the Chair of Geology in 1891 he had some twinges of conscience as to the possible breach of faith with the Government, and asked his legal friend to examine the contract made between the Department and himself. After providing ample legal sanction and freedom of tie in his report, David came to him with an anxious face: "I think", he said, "you haven't been quite fair to the other side", and went on to argue their case, much to the amusement of the lawyer at this novel form of client.

He was always ready to give full credit to others, as, for example, in the Kosciusko observations of Richard Helms and in many speeches on work in which another had the smallest share.

Here are extracts from the letters of two of his University students: (1) "He was always so full of cheer and so full of charity, I always describe him as the most Christian man I have ever come in contact with. Often I look at his picture when I need courage to go forward, and then I think of his indomitable courage and find I can go on willingly."—(2) "Every right thought, every incentive for good has come to me from my loved professor. . . . Everything good or decent and honourable in myself has been brought out by his perfect example." These—and one could quote many of the like—are the records of a great teacher, whose principles became ingrained in his moral fibres in those early days when he learned from his prototype, "I will lift up mine eyes unto the hills whence cometh my help".

Amongst his mental endowments was a fine talent for drawing. Not only was this a great instrument for demonstration in blackboard work in lectures, but he could produce artistic sketches of scenes in real life, as he did in his home letters from the war. Curiously, this was not accompanied as usual—especially in the Welsh—by any musical sense, for he declared that he could only recognize two tunes, "God Save the King" and "March of the Men of Harlech". He loved poetry and good literature with all the love of a Celtic bard, and his memory was marvellous. Often would he quote not only phrases, but long passages from his old favourites, Tennyson and Browning. One evening he recited, from memory, the whole of 'Oenone', and I think the passage—

"Self reverence, self knowledge, self control,
These three alone lead life to sovereign power.
. . . . . .
Acting the law we live by without fear;
And, because right is right, to follow right
Were wisdom in the scorn of consequence"

was the very warp and woof of his life.

In late years his greatest relaxation was to lie on the floor and read Dickens to his grandchildren. A re-reading of Nicholas Nickleby was unfinished at his death.

We mourn his loss, but his life was joyous because so largely devoted to things in which he was intensely interested. In this Society we knew him as a genuine disciple of the great Linnaeus, in that Nature was to him the devised plan of the Great Architect, in whose cosmic cathedrals he loved to worship in the sense that those monks used the phrase "laborare est orare", and who did actually see "sermons in stones; books in the running brooks". After his Antarctic experiences he would quote Newman's "Lead, Kindly Light" as the refrain that had helped to bring him through. He was a practical idealist, carrying out the great things he planned, whether it was as a skilled craftsman repairing the boring plant at Funafuti or in thinking out workable schemes for the conquest of Erebus.

He was often wearied, dropping asleep when toiling on in the small hours, but he was never bored; and he died as he had lived, in harness, carrying on in the spirit of Ulysses—

"How dull it is to pause, to make an end,
To rust unburnish'd, not to shine in use!
As tho' to breathe were life. Life piled on life
Were all too little, and of one to me
Little remains: but every hour is saved
From that Eternal Silence, something more,
A bringer of new things; and vile it were
For some three suns to store and hoard myself,
And this gray spirit yearning in desire
To follow knowledge, like a sinking star,
Beyond the utmost bound of human thought."

H.J.C.

As a teacher David had few equals. In the early days of his occupancy of the Chair of Geology it fell to his lot to lecture on many branches of the science, and even till his retirement he insisted on giving the lectures to the first year class. No doubt there was much wisdom in this practice, since it is often in his first year that a student's orientation to his studies is definitely determined. And David's method of presentation of his subject was calculated to arrest the attention and arouse the interest of the least enthusiastic. He was a firm believer in the appeal to the eye as well as to the ear, and the spoken word was reinforced by specimens, by lantern slides and, above all, by those inimitable and artistic geological sections which used to grow as if by magic beneath his hand on the capacious blackboards, to the accompaniment of a running comment of explanation. A carefully-prepared synopsis of the lecture was invariably given out, but not infrequently it was in large measure ignored.

Apart from the actual gain in knowledge, students at these lectures inevitably got the impression of geology as a living and a growing science of absorbing interest, in which great things were doing and to be done, and in whose advancement each one of them might hope one day to play a part.

Further, no trouble was too great to be taken for a student who diffidently sought help in difficulty. From the least to the greatest all were sure of the same patient hearing, the same gracious courtesy, and the same careful elucidation of the knotty point.

Privileged indeed were those who accompanied him on a field-excursion, for on such occasions he was at his best. Many an old student cherishes pleasant memories of the exploits and adventures incidental to a geology camp at Gerringong, or Pokolbin, or Kosciusko, or some other place, where good geology was seasoned with the good fellowship that emanated from the leader of the party.

Little wonder that under the spell of David's personality many of his students took up geology as a life-work and have made their mark in Australia or abroad.

In the field of geological research David's interests were manifold, and he belonged to a scientific type which in these days of specialization is almost extinct. Indeed, it has been suggested that the spreading of his activities set limits to the greatness of his scientific achievements, but there can be little doubt that the wide range of his knowledge contributed materially to the breadth of his vision and to his grasp of the essentials of geological problems.

As an economic geologist his chief claim to distinction rests upon his tracing of the Greta coal-measures and the consequent economic development of the very important South Maitland coalfield; but his record also includes the investigation of the Vegetable Creek tinfield and—chiefly in conjunction with the late Mr. E. F. Pittman—a study of the problems of the Great Australian Artesian Basin.

He was early attracted to problems of structural and tectonic geology, and in many of his publications, with the aid of maps and sections, he has demonstrated graphically and in striking fashion the outstanding structural features of the State and the continent. An able summary of the chief tectonic lines of Australia is contained in his Presidential Address to the Royal Society of New South Wales, delivered in 1911.

In stratigraphical geology his greatest—as it was almost his earliest—interest was in the Permo-Carboniferous System, which had been the subject of his chief investigation when he was a member of the Geological Survey. Later, after the discovery of glacial beds at Seaham, he became a keen and active student of the problems of Carboniferous stratigraphy. Nor were his stratigraphical interests confined to this State. It was at his suggestion that the great sequence of strata overlying the pre-Cambrian schists in South Australia was detached from the Cambrian System and established as a separate Proterozoic Series. Indeed, there are few of the geological systems as developed in Australia to the knowledge of which he did not make important contributions.

The interest in glaciation which he first displayed in his native Wales remained with him throughout his life. The list of his papers on subjects connected with Australian glaciology is a long one; many of his contributions appear in the Reports of the Glacial Committee of Section C of the Australasian Association for the Advancement of Science. Of this committee he was Secretary from its inception in 1892 till the time of his death, and no inconsiderable portion of its reports really represents the results of work carried out by himself alone or in conjunction with his friend and colleague, Professor W. Howchin. His investigations included the South Australian Proterozoic tillites as well as the Permian tillites, etc., of South and Western Australia and New South Wales, and the Pleistocene deposits of Tasmania and Kosciusko.

A very fruitful line of research was opened up as a result of his discovery in 1914, while leading a British Association excursion, of glacial tillite at Seaham, near Maitland. Researches originating from this discovery have proved the existence of a great ice-age in Carboniferous time in Australia, the traces of which in New South Wales are now known to extend from the Hunter Valley for at least 120 miles northwards.

Outside Australia he made important contributions to our knowledge of the glacial geology of Antarctica, as well as of its physiography and general geology.

His services on the Western Front in the Great War are too well known to need recapitulation. A great variety of problems had to be solved, such as the finding of material for roads and concrete-making, the provision of water supplies, and, above all, the selecting of sites for trenches, dugouts and mine-tunnels. These last called for very close and detailed study of the dry and water-bearing strata, and of the seasonal fluctuations of the water-table, as well as of structural features such as folds and faults. The success of his labours, in the face of many difficulties, is a tribute no less to his tireless energy and indomitable will-power than to his geological ability.

In his geological research, as in all the other activities of his busy life, David combined with a passion for meticulous detail a broad and philosophic outlook. These characteristics, which would have gone far to bring him to eminence in any walk of life, were no doubt inherent in the man, but they had been nourished and strengthened by his early training, and it is no exaggeration to say that he was all the greater geologist because he was a classical scholar and had steeped himself in the literature and imbibed the thought-habits of the best thinkers and the best writers of ancient and modern times.

In spite of the immense amount of actual geological investigation he accomplished it is probable that his best contribution to Australian geology came through the exercise of his faculty for taking the long view, and for correlating and linking up geological formations far apart geographically. This faculty is particularly necessary in Australia, where most of the geological work has been carried on, more or less inevitably, within the water-tight compartments of State boundaries. Not once nor twice has the remark been made that comparison of State geological maps shows the curious feature of geological strata abruptly truncated by inter-State border-lines. It was David's happy privilege to do much to break down these unnatural barriers to geological progress, and his New Geological Map of the Commonwealth, published in 1932, embodies the first attempt on a large scale to represent the geological formations of the whole of Australia by a uniform set of symbols.

Here is the testimony of Sir Thomas Holland, given before the Geological Society of London in February, 1934: "Australia, alone among the Dominions, has no Commonwealth Geological Survey. Providence has, however, lent it temporarily the services of Sir Edgeworth David, who is possibly the only man living who could have correlated the scattered State Records to produce a Geological Map of the whole Commonwealth like that which he published two years ago."

The bringing of the details of Australian geological history into correlation with those of other parts of the world also engaged much of his attention, and it was largely this outstanding characteristic of his work that commended it to the attention of overseas geologists. It is true that on occasion his enthusiasm—one might almost say his passion—for correlation led him into mistakes, an

almost inevitable happening, but no one was ever more ready than he to acknowledge and forsake error.

A word must be said about an investigation which in later years called forth all his characteristic unwearying and persistent enthusiasm. For many years he had envisaged the possibility that the rocks of the pre-Cambrian Adelaide Series of South Australia might yield fossil evidences of contemporary life, but it was not till 1928 that his quest was rewarded by the discovery of what he regarded with confidence as casts of animal fossils. A preliminary paper on some of these appeared in the *Transactions of the Royal Society of South Australia* for 1928; with the aid of grants from the Royal Society of London, much excavation was done and many more specimens were obtained. A monograph on some of these forms was written by David in conjunction with Dr. R. J. Tillyard, and has recently appeared in print.

The task that absorbed most of the energy of his later years, however, was that of writing a book on the Geology of the Commonwealth. Originally projected as far back as 1914, and even earlier, the work was interrupted by the Great War and was resumed as circumstances permitted after David's return to Australia. Eventually the plan for a one-volume book, which was well on towards completion, was abandoned in favour of a more detailed work of three volumes. Many years were devoted to the patient accumulation and examination of material for what would unquestionably have been a monumental work, but unfortunately it was never finished. It is pleasing to know, however, that, through the action of the New South Wales Government in acquiring the manuscript and making arrangements for its completion and publication, the fruits of a long life's labours are not to be lost.

Of David it might be said, as it was of Goldsmith, *Nihil tetigit quod non ornavit*. For certainly there is no branch of geological science to which he turned his attention that is not the richer for his researches. In no small degree will our knowledge of Australian geology be built on the foundations he has so well and faithfully laid, and his work and his example will long remain to kindle the enthusiasm and inspire the efforts of future workers.

W.R.B.

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